REMARKS

Claims 1-11 and 24-37 are unchanged and remain pending in the present application. In view of the above amendment, applicant believes the pending application is in condition for allowance.

NOTE REGARDING PREVIOUSLY SUBMITTED IDS

Applicants note that the Examiner has not initialed the cited reference 6,194,818 (Sumi et al.), which is the first listed reference in applicants' IDS filed Dec 8, 2006. The other references in this IDS were initialed by the Examiner on March 11, 2008, thus it is believed that the Examiner has reviewed the cited reference 6,194,818 but that the Examiner's initials were simply inadvertently omitted. See copy of IDS attached.

Applicants respectfully request the Examiner to initial the 6,194,818 reference as having been considered.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 2, 6-11, 24, 25, 29, 31-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murai (U.S. Pat. No. 6,705,708) in view of Takamatsu et al. (U.S. Pat. No. 6,624,458).

Claims 3 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murai (U.S. Pat. No. 5,705,708) in view of Takamatsu et al. (U.S. Pat. No. 6,624,458) and further in view of Qiu et al. (U.S. Pat. No. 6,402,304).

Claims 4, 5, 27, 28 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murai (U.S. Pat. No. 6,705,708) in view of Takamatsu et al. (U.S. Pat.

No. 6,624,458) and further in view of Murai (U.S. Pat. No. 6,494,567) and Murai (U.S. Pat. No. 7,083,269). These rejections are respectfully traversed.

The Examiner states that Murai discloses that "a layered piezoelectric film including a first thin piezoelectric film and a second thin piezoelectric film has preferred orientation along the (111) plane (see column 8, lines 43-47)."

As shown in S1-S5 of Fig. 5, Murai forms, first of all, a piezoelectric layer 43a corresponding to the first thin piezoelectric film of the present invention. The piezoelectric layer 43a has preferred orientation along a 100 plane (in column 7, lines 25-28, the layer 43a has a 100 plane orientation degree of no less than 80%). Then, a hole is formed in the piezoelectric layer 43a (S4) and a piezoelectric layer 43 is stacked. As a result, a part of the piezoelectric layer 43 that is formed on the piezoelectric layer 43a (there is no hole) has preferred orientation along the 100 plane. On the other hand, a part of the piezoelectric layer 43 that is formed in a place where a ZrO_2 film 32 is exposed has preferred orientation along a 111 plane (see column 8, lines 39-47).

The portion with no hole has a two-layer structure of the piezoelectric layer 43a having preferred orientation along a 100 plane and the piezoelectric layer 43 above the layer 43a having preferred orientation along a 100 planed.

In this way, the layered piezoelectric film of Murai has preferred orientation along the 100 plane, which is different from the present invention characterized in that the layered piezoelectric film has preferred orientation along the 111 plane.

On the other hand, as stated in the Office Action, the part of the piezoelectric layer 43 formed in the place where a ZrO_2 film 32 is exposed has preferred orientation along the

111 plane (column 8, lines 43-47 of Murai). However, the layer 43 comprises only one piezoelectric film, not a layered piezoelectric film including a first thin piezoelectric film and a second thin piezoelectric film like the present invention.

In this way, Murai neither discloses nor suggests the element of the present invention characterized in that the layered piezoelectric film including a first thin piezoelectric film and a second thin piezoelectric film is made of perovskite oxide having preferred orientation along the (111) plane.

The Examiner states that Murai discloses that "the columnar grains of the second thin piezoelectric film have a larger average cross-sectional diameter than the columnar grains of the first thin piezoelectric film (see column 8, lines 21-23)."

As shown in S5 of Fig. 5, Murai just discloses that the total thickness of the second piezoelectric layer 43 (formed by the second forming step) is greater than the thickness of first piezoelectric layer 43a (formed by the first forming step) (see column 8, lines 21-23). It appears that Murai neither discloses nor suggests that an average cross-sectional diameter of the columnar grains constituting the piezoelectric layer sectioned along the lateral direction. In other words, an average cross-sectional diameter is not considered in Murai, at all.

Accordingly, Murai neither discloses nor suggests that the elements of the present invention characterized in that the columnar grains of the second thin piezoelectric film have a larger average cross-sectional diameter than the columnar grains of the first thin piezoelectric film.

The Examiner states that Tatematsu et al. discloses that "the ratio of the thickness of the layered piezoelectric film to the average cross-sectional diameter of the columnar grains of the second thin piezoelectric film is 20 to 60 inclusive (see column 7, lines 29-31)."

Tatematsu just discloses, in column 7, lines 29-31, that "the IrOx film 16 has a columnar microstructure composed of columnar crystals having a grain size of 20-50 nm."

The IrOx film 16 is an upper electrode, not a piezoelectric layer (PZT). In other words, Tatematsu just discloses that "the IrOx film 16 has a columnar microstructure composed of columnar crystals having a grain size of 20-50 nm." The description is irrelevant to the piezoelectric film, even to the columnar grains of the thin piezoelectric film, or the thickness of a layered piezoelectric film.

In this way, Tatematsu neither discloses nor suggests the element of the present invention characterized in that "the ratio of the thickness of the layered piezoelectric film to the average cross-sectional diameter of the columnar grains of the second thin piezoelectric film is 20 to 60 inclusive."

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated:____May 9, 2008_____

By__/Gregory A. Stobbs/_____
Gregory A. Stobbs
Registration No.: 28,764
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1214
Attorney for Applicant